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GABRA2 and frequency of alcohol consumption in a college population

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ABSTRACT

Spit for Science: the VCU Student Survey aims to understand how genes and the environment come together to influence substance use and emotional health. Many studies have investigated the potential relationship between genetic variants in the *GABRA2* gene and an individual's subjective level of response to alcohol. Evidence suggests that individuals with specific *GABRA2* variants have a lower subjective level of response to alcohol thus causing them to drink more, which in turn increases their risk for becoming alcohol dependent. The goal of the current study was to investigate the association between specific *GABRA2* variants and alcohol use frequency in a sample of college students. VCU freshman in the 2011 fall semester were given the opportunity to complete the Spit for Science survey and provide a DNA sample. Linear regression was used to test the relationship between alcohol use frequency and *GABRA2* variation. We also investigated the possible moderating effect of peer deviance on this relationship. The proposed questions addressed in this study are highly important because they may provide us with information on how to potentially help young adults from developing alcohol dependence.

INTRODUCTION

Freshmen year of college is the first time, for most students, when they are away from home and have a new sense of freedom. According to the NIAAA, about 4 out of 5 college students drink alcohol.[1] Studies show that certain high risk *GABRA2* genotypes are associated with subjective level of response to alcohol and consequently can affect the risk of one developing alcohol use disorders[2,3].

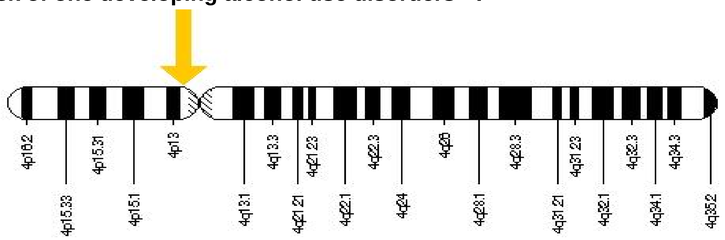


Figure 1.[4] Where Is the *GABRA2* Gene Located?

- **The *GABRA2* gene is located on the short (p) arm of chromosome 4 (46,244,452 to 46,390,038).**
- **It encodes the alpha 2 subunit of the human GABA(A) receptor.**

Objectives:

- **Test for association between 8 Single Nucleotide Polymorphisms (SNPs) in *GABRA2* and alcohol use frequency.**
- **Test for moderation of the association between *GABRA2* and alcohol use frequency as a function of peer deviance.**

Hypothesis:

- ***GABRA2* will be associated with alcohol use; high risk genotypes will be associated with an increase in alcohol drinking frequency.**
- **Individuals with high risk genotypes and more deviant peers will show increased drinking frequency.**

METHODS

Sample: Spit for Science

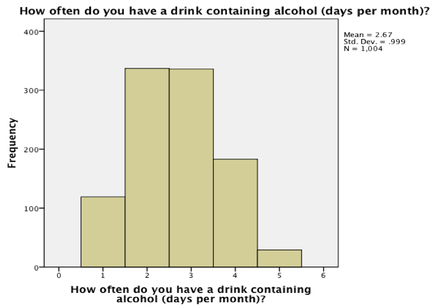
- **2011 Freshmen Cohort**
- **Survey (Spring 2011) & DNA samples (genotyped on Affymetrix Axiom BioBank array)**
- **Total N = 1,004**
- **Linear regression with age, sex, and ethnicity as covariates (valid N = 786)**
- **Tested SNPs: rs3113346, rs3822051, rs2439209, rs558111, rs17537359, rs4695148, rs116039536, rs16859354**

Dependent Variable: Alcohol Use

- **"How often do you have a drink containing alcohol (days per Month)?"**
- **Response options (see Figure 2): Never (1), Monthly or less (2), 2 to 4 times a month (3), 2 to 3 times a week (4), 4 or more times a week (5)**

Figure 2.

Drinking Frequency (last 30 days)

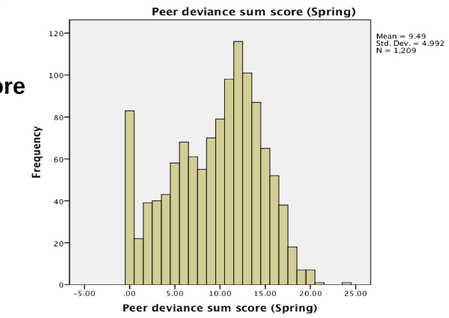


Potential moderator: Peer Deviance

- **"How many of your (college) friends would endorse the following behaviors: getting drunk, smoking cigarettes, having problems with alcohol, drinking alcohol, smoking marijuana and getting in trouble with the law?"**
- **Response options: None (1), A few (2), Some (3), Most (4), All (5)**
- **Sum score computed (see Figure 3)**

Figure 3.

Peer Deviance Sum Score



RESULTS

- We found no significant association between *GABRA2* and alcohol use frequency.
- We likewise found no significant moderating effects of peer deviance on the relationship between *GABRA2* and alcohol use.
- We did find that a student's age was positively associated with the frequency of alcohol consumption (see figure 4).

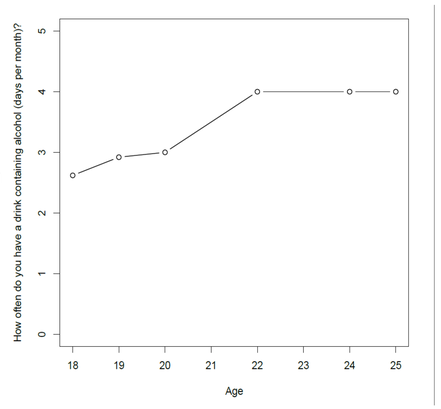
RESULTS

Figure 4.

Age and Drinking Frequency

-This graph represents the one significant association finding of the study.

-As age increased, frequency of alcohol consumption increased likewise.



CONCLUSIONS

Implications:

- **No effect of *GABRA2* variation on alcohol use in this sample**
- **No moderating effect of peer deviance on the relationship between alcohol use and genotype**

Limitations:

- **Sample mostly under 21**
- **VCU students only**
- **Only looked at alcohol use (not abuse or dependence)**

Future Directions

- **More cohorts (bigger sample size)**
- **Older Students**
- **Longitudinal Studies**
- **Use alcohol dependence as a main outcome**

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